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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,678	03/24/2004	Joseph Gil	YOR919990210US2 (8728-282	4311

46069 7590 11/21/2007	EXAMINER
F. CHAU & ASSOCIATES, LLC 130 WOODBURY ROAD WOODBURY, NY 11797	INGBERG, TODD D

ART UNIT	PAPER NUMBER
2193	

MAIL DATE	DELIVERY MODE
11/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/807,678	GIL ET AL.
	Examiner	Art Unit	
	Todd Ingberg	2193	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>18 September 2007</u>.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>21-41</u> is/are pending in the application.

    4a) Of the above claim(s) <u>1-20</u> is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Claims 21 – 41 have been examined.

Claims 1 – 20 have been canceled.

Claims 21, 22, 28, 29, 35, 36, have been amended.

Specification

1.   The abstract of the disclosure is objected to because the Abstract is more than 150 words.

Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 102

2.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3.   Claims 21 – 41 are rejected under 35 U.S.C. 102(b) as being anticipated by "Space and

Time Efficient Memory Layout for Multiple Inheritance", Joseph Gil et al, 1999.

Examiner's Interpretations
A. The number of level of inheritance is not distinguishable. The process is the same regardless (third class, fourth class etc) see Title multiple inheritance
B. The number of classes present can be the maximal independent set.

Claim 21
A method for compiling object oriented code to produce an application having a reduced size, comprising: determining a virtual base class of the object oriented code virtually derived by a plurality of classes, each sub object of the plurality of classes comprising a virtual base pointer to a sub object of the virtual base class; inlining the virtual base class into at least a first class of the plurality of classes, **wherein the virtual base class is stored in a fixed offset in a memory layout of the first class;** and compiling the object oriented code to produce the application.
Examiner's Rejection

Gil anticipates compiling object oriented code to produce an application having a reduced size
(Gil, page 261, section 3.1 Eliminating Transitive Virtual Inheritance"), by determining a virtual
base class of the object oriented code virtually derived by a plurality of classes (Gil, page 257 -
260), each sub object of the plurality of classes comprising a virtual base pointer to a sub object
of the virtual base class (Gil, page 258, Figure 1 and the definitions and text supporting figure –
subobject graph); inlining the virtual base class into at least a first class of the plurality of
classes (Gil, page 261, 3 Streamlining Virtual Inheritance), wherein the virtual base class is
stored in a fixed offset in a memory layout of the first class (Gil, page 256, 1.1 Multiple
Inheritance in C++); and compiling the object oriented code to produce the application (Gil,
page 256, Abstract).

Claim 22
The method of claim 21, wherein inlining comprises: eliminating a virtual base pointer to the sub
object of the virtual base class from a memory layout of the first class; and storing the sub object
of the virtual base class in a the fixed offset in the memory layout of the first class in which the
virtual base pointer was eliminated, **wherein the sub object is shared via a virtual base
pointer to the subobject at the fixed offset in the memory layout of the first class**.
Examiner's Rejection
See page 260, of rejection for claim 1

Claim 23
The method of claim 21, further comprising: determining the first class derived from the virtual
base class to be duplicated in a second class that inherits from the first class; and preventing
inlining of the virtual base class into the first class.
Examiner's Rejection
As per claim 21 canceling inheritance prevents inlining.

Claim 24
The method of claim 21, further comprising: determining a third class that inherits from the
virtual base class through a set of classes, where each class of the set of classes virtually inherits
from the virtual base class; and inlining the virtual base class into at least a second class of the
set of classes.
Examiner's Rejection
Inlining as per claim 22.

Claim 25
The method of claim 24, wherein the set of classes is a maximal independent set.
Examiner's Rejection
The result of inheritance produces a maximal independent set (As per claim 21).

Claim 26
The method of claim 24, where inlining comprises: eliminating a virtual base pointer to the
subobject of the virtual base class from the memory layout of the second class; and storing the

subobject of the virtual base class in a fixed offset in the memory layout of the second class in which the virtual base pointer was eliminated.

Examiner's Rejection

The mechanism as per claim 22. The level of inheritance in the model is not a factor in determining patentability. It does indicate more than one level which is well known to be part of C++ as per claim 21. (covered by Gil).

Claim 27

The method of claim 24, further comprising: determining the second class derived from the virtual base to be duplicated in a fourth class that inherits from the second class; and preventing inlining of the virtual base class into the second class.

Examiner's Rejection

As per the rejection for claim 26.

Claim 28

A method for compiling object oriented code to produce an application having a reduced size, comprising: removing transitive virtual inheritance from between a virtual base class and a first class inheriting from the virtual base class, wherein the first class inherits non-virtually from a second class and the second class inherits virtually from the virtual base class, upon determining the presence of transitive virtual inheritance; removing single virtual inheritance from between the virtual base class and a third class virtually inheriting from the virtual base class, wherein the third class is the only class inheriting from the virtual base class, upon determining the presence of single virtual inheritance; determining a virtual base class of the object oriented code virtually derived by a plurality of classes, each subobject of the plurality of classes comprising a virtual base pointer to a subobject of the virtual base class; inlining the virtual base class into at least a fourth class of a plurality of classes virtually derived from the virtual base class, wherein the virtual base class is stored in a fixed offset in a memory layout of the fourth class; and compiling the object oriented code to produce the application

See the rejection for claim 21.

Claim 29

The method of claim 28, wherein inlining comprises: eliminating a virtual base pointer to a subobject of the virtual base class from a memory layout of the fourth class; and storing the subobject of the virtual base class in a the fixed offset in the memory layout of the fourth class in which the virtual base pointer was eliminated, wherein the subobject is shared via a virtual base pointer to the subobject at the fixed offset in the memory layout of the fourth class. See the rejection for claim 22.

Claim 30

The method of claim 28, further comprising: determining the fourth class derived from the virtual base class to be duplicated in a fifth class that inherits from the fourth class; and preventing inlining of the virtual base class into the fourth class.

See the rejection for claim 23.

Claim 31
The method of claim 28, further comprising: determining a seventh class that inherits from the virtual base class through a set of classes, where each class of the set of classes virtually inherits from the virtual base class; and inlining the virtual base class into at least a sixth class of the plurality of classes that virtually inherit from the virtual base class.
See the rejection for claim 24.

Claim 32
The method of claim 31, wherein the set of classes is a maximal independent set.
See the rejection for claim 25.

Claim 33
The method of claim 31, wherein inlining comprises: eliminating a virtual base pointer to the subobject of the virtual base class from the memory layout of the sixth class; and storing the subobject of the virtual base class in a fixed offset in the memory layout of the sixth class in which the virtual base pointer was eliminated.
See the rejection for claim 26.

Claim 34
The method of claim 31, further comprising: determining the sixth class derived from the virtual base class to be duplicated in a eigth class that inherits from the sixth class; and preventing inlining of the virtual base class into the sixth class.
See the rejection for claim 27.

Claim 35
A method for compiling object oriented code to produce an application having a reduced size, comprising: removing transitive virtual inheritance from between a virtual base class and a first class inheriting from the virtual base class, wherein the first class inherits non-virtually from a second class and the second class inherits virtually from the virtual base class, upon determining the presence of transitive virtual inheritance; determining a virtual base class of the object oriented code virtually derived by a plurality of classes, each subobj ect of the plurality of classes comprising a virtual base pointer to a subobject of the virtual base class; inlining the virtual base class into at least a third class of a plurality of classes virtually derived from the virtual base class, wherein the virtual base class is stored in a fixed offset in a memory layout of the third class; and compiling the object oriented code to produce the application
See the rejection for claim 21.

Claim 36
The method of claim 35, wherein inlining comprises: eliminating a virtual base pointer to the subobj ect of the virtual base class from the memory layout of the third class; and storing the subobject of the virtual base class in a the fixed offset in the memory layout of the third class in which the virtual base pointer was eliminated, wherein the subobject is shared via a virtual base pointer to the subobject at the fixed offset in the memory layout of the third class.
See the rejection for claim 22.

Claim 37
The method of claim 35, further comprising: determining the third class derived from the virtual base class to be duplicated in a fourth class that inherits from the third class; and preventing inlining of the virtual base class into the third class.
See the rejection for claim 23.

Claim 38
The method of claim 35, further comprising: determining a fourth class that inherits from the virtual base class through a set of classes, where each class of the set of classes virtually inherits from the virtual base class; and
        inlining the virtual base class into at least a fifth class of the plurality of classes that virtually inherit from the virtual base class.
See the rejection for claim 24.

Claim 39
The method of claim 38, wherein the set of classes is a maximal independent set.
See the rejection for claim 25.

Claim 40
The method of claim 38, wherein inlining comprises: eliminating a virtual base pointer to the subobject of the virtual base class from a memory layout of the fifth class; and storing the subobject of the virtual base class in a fixed offset in the memory layout of the fifth class in which the virtual base pointer was eliminated.
See the rejection for claim 26.

Claim 41
The method of claim 38, further comprising: determining the fifth class derived from the virtual base class to be duplicated in a sixth class that inherits from the fifth class; and preventing inlining of the virtual base class into the fifth class.
See the rejection for claim 27.

Conclusion

4.   Applicant's amendment necessitated the new ground(s) of rejection presented in this

Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

        A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this
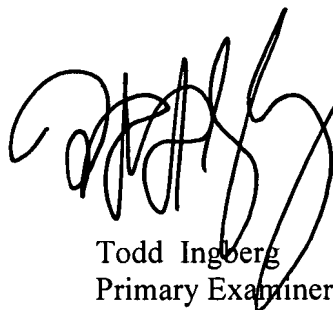
final action.

Correspondence Information

5.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Todd Ingberg whose telephone number is (571) 272-3723. The

examiner can normally be reached on during the work week..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Todd Ingberg
Primary Examiner
Art Unit 2193

TI